denoted $V_{Rx}(k, t_n)$. Motion compensation functions 318, 328, and 338 may remove time dependent phase delays between the transmitter and receiver system. Motion compensation may be performed for each receiver sub-aperture independently. Because the received signal is a composite of transmitted signals, a single point on the transmitter, such as transmitter 200, may be motion compensated. The transmitter may be known as the j_0th transmitter sub-aperture. To simplify the derivations, a scaling also may be included in motion compensation functions 318, 328, and 338. The scale factor may be the inverse of the transmitted signal strength. The signal strength may be proportional to the square-root of the transmitter power delivered to the j_0th transmitter sub-aperture. The motion compensated signal may be given by:

$$X_k(t) \equiv \frac{V_{Rx}(k,t)}{V_{Tx}(t)} e - 2\pi i f(t - \tau(\overline{X}_{Tx\,:\,j0}(t) - \overline{X}_{Rx\,:\,k}(t)))$$

where f is the center frequency of the transmitted signal, and,

$\tau(\overline{X}_{Tx\,:\,j0}(t) - \overline{X}_{Rx\,:\,k}(t))$ is the signal propagation delay from the j_0th transmitter sub-aperture to the kth receiver sub-aperture. For example, transmitter sub- aperture 210 may send a signal to receiver sub-aperture 310 that is motion compensated. The above algorithm discloses the motion compensation operation performed by motion compensation function 318.

2. Paragraph 00054 beginning on page 21, replace the paragraph with:

A2

Waveform compensation may be initialized and/or updated once per coherent processing interval. The coherent processing interval is chosen such that the number of signal samples is greater than or equal to J, or the number of transmitter sub-apertures, times M, or the number of delay values desired to cover the ground clutter grid. A waveform compensation filter computation function 408 may generate and format an $N_t \times (J \cdot M)$ array of delayed reference signals, where N_t may be the number of samples in a coherent processing interval. The reference signal data, $s_j\,(t_n - \tau_m)$, associated with the m^{th} delay for the j^{th} transmitter sub-aperture is mapped into the q^{th} column, where $q(j,\mu) = \mu + (j-1) \cdot M$. The inverse map of the generalized index, q, into the sub-aperture index, j, and the delay index, μ, may be given by:

$$\mu \equiv \mathrm{mod}(q,M)$$

$$j \equiv \mathrm{floor}\left(\frac{q}{M}\right)$$

3. Paragraph 00055 beginning on page 22, replace the paragraph with:

A3

For the coherent processing interval starting with the time sample t_{n0}, the array of delay-compensated reference data may be given by:

$$\Sigma_{n,q}(n_o) \equiv s_{j(q)}(t_n - \tau_{\mu(q)})$$

where $n \in [n_o, n_o - N_t - 1]$ and $q \in [1, J \cdot M\text{-}1]$

4. Paragraph 00056 beginning on page 22, replace the paragraph with:

The term also may be written in terms of $\tilde{S}_{j,n} \equiv S_j(t_n)$. Because

A4

$t_n - \tau_{\mu(q)} = t_{n-\mu(q)}$ and $S_j(t_n - \tau_\mu) = \tilde{S}_{j,n-m}$, the array of delay-compensated reference may be given by:

$$\sum(n_0) \equiv \left(\begin{array}{cccc|c|cccc|c|cccc} \tilde{S}_{0,n_0} & \tilde{S}_{0,n_0-1} & \cdots & \tilde{S}_{0,n_0-M+1} & \tilde{S}_{1,n_0} & \tilde{S}_{1,n_0-1} & \cdots & \tilde{S}_{0,n_0-M+1} & \cdots & \tilde{S}_{j-1,n_0} & \tilde{S}_{j-1,n_0-1} & \cdots & \tilde{S}_{j-1,n_0-M+1} \\ \tilde{S}_{0,n_0-1} & \tilde{S}_{0,n_0-2} & \cdots & \tilde{S}_{0,n_0-M} & \tilde{S}_{1,n_0-1} & \tilde{S}_{1,n_0} & \cdots & \tilde{S}_{1,n_0-M} & \cdots & \tilde{S}_{j-1,n_0-1} & \tilde{S}_{j-1,n_0} & \cdots & \tilde{S}_{j-1,n_0-M} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \tilde{S}_{0,n_0+N_t-1} & \tilde{S}_{0,n_0+N_t-2} & \cdots & \tilde{S}_{0,n_0+N_t-M} & \tilde{S}_{1,n_0+N_t-1} & \tilde{S}_{1,n_0+N_t-2} & \cdots & \tilde{S}_{0,n_0+N_t-M} & \cdots & \tilde{S}_{j-1,n_0+N_t-1} & \tilde{S}_{j-1,n_0+N_t-2} & \cdots & \tilde{S}_{j-1,n_0+N_t-1} \end{array} \right)$$

5. Paragraph 00061 beginning on page 23, replace the paragraph with:

A5

Then, the array of compensated reference signals may be given by:

$$\Sigma_{n,q}(n_0) \equiv e^{2\pi i f_{v(q)}(t_n - \tau_{\mu(q)})} S_{j(q)}\left(t_n - \tau_{\mu(q)} - \frac{\lambda f_{v(q)}}{c_{light}}(t_n - \tau_{\mu(q)}) \right)$$

where $n \in [n_0, n_0 + N_t - 1]$ and $q \in [1, J \cdot M \cdot N\text{-}1]$.

6. Paragraph 00062 beginning on page 24, replace the paragraph with:

A6

For the k^{th} receiver system sub-aperture, H is a vector of length J·M·N. Vector H may be reformatted into a J×(M×N) array where the j^{th} element discloses the dependence of the channel transfer function on transmitter sub-array degrees of freedom and (μ,v) discloses the delay and doppler dependence.

7. Paragraph 00082 beginning on page 32, replace the paragraph with:

A7

Step 708 executes by linearizing the phase delay of the BCTF. Linearization contd A7

of the phase delay in the BCTF may demonstrate the dependence on doppler and the bearing of transmitter 200 and receiver 300 to the clutter patch, or

$$\varphi_{c:jk}(\overline{x}_c, t) = \varphi_0 + K^T \circ D_p$$

where $$D_p = \begin{bmatrix} d_{Tx}\left[\sin(\phi_{Tx\_c}) + \sin(\phi_{Tx\_Rx})\right] \\ d_{Rx}\left[\sin(\phi_{c\_Rx} + \eta_{Rx}) - \sin(\phi_{Tx\_Rx} + \eta_{Rx})\right] \\ V_{Tx}\left[\sin(\phi_{Tx\_c}) + \sin(\phi_{Tx\_Rx})\right]\delta t_{nyquist} + V_{Rx}\left[\sin(\phi_{c\_Rx}) - \sin(\phi_{Tx\_Rx})\right]\delta t_{nyquist} \end{bmatrix}$$

8. Paragraph 00083 beginning on page 33, replace the paragraph with:

A8

Step 710 executes by absorbing the constant phase term into the relative strength of the scattered signal, or $A_{c:j,k}$. Thus, the BTCF may be given by

$$H_{c:j,k}(\tau, t) \equiv \int_{\left[\Delta\tau_c(\overline{x}_c) = \tau\right]} e^{-iK^T \bullet D_p} A_{c:j,k}(\overline{x}_c, \overline{x}_{Tx}, \overline{x}_{Rx}) d^2\overline{x}_c$$

9. Paragraph 00087 beginning on page 34, replace the paragraph with:

A9

Step 718 executes by generating a linear system model for the signal model. The linear system model may be expressed as

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